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Datasheet for the decision of 12 May 2010

Case Number: T 0342/08 - 3.3.01

Application Number: 99301178.2

Publication Number: 0937769

IPC: C10M 145/14

Language of the proceedings: EN

Title of invention:
Viscosity improvers for lubricating oil compositions

Patentee:
The Lubrizol Corporation

Opponent:
Evonik Röhm GmbH

Headword:
Viscosity improvers/LUBRIZOL CORP.

Relevant legal provisions:
EPC Art. 114(1), 112a, 100(b), 99, 56, 54
RPBA Art. 15(4)

Keyword:
"Admission of an objection based on Article 100(b) - (no) - not substantiated in grounds of opposition"
"Novelty (yes) - public prior use not convincingly shown"
"Inventive step - (yes) - unexpected improvement credibly shown on the whole scope"

Decisions cited:
G 0010/91, G 0001/03

Catchword:
-

Case Number: T 0342/08 **-** 3.3.01

DECISION
of the Technical Board of Appeal 3.3.01
of 12 May 2010

Appellant:
(Patent Proprietor)

The Lubrizol Corporation
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Decision under appeal:

Decision of the Opposition Division of the European Patent Office posted 21 December 2007 revoking European patent No. 0937769 pursuant to Article 102(1) EPC.

Composition of the Board:

Chairman: P. Ranguis
Members: J.-B. Ousset
C.-P. Brandt

Summary of Facts and Submissions

I. This appeal was based on the decision of the opposition division to revoke European patent No. 0 937 769 for lack of inventive step.

II. Claim 1 of the main request (granted claim 1) read as follows:

"1. A copolymer comprising units derived from

(a) methacrylic acid esters containing from 9 to 25 carbon atoms in the ester group and
(b) methacrylic acid esters containing from 7 to 12 carbon atoms in the ester group, said ester groups having 2-(C_{1-4} alkyl)- substituents, and optionally
(c) at least one monomer selected from methacrylic acid esters containing from 2 to 8 carbon atoms in the ester group atoms and which are different from methacrylic acid esters (a) and (b), vinyl aromatic compounds, and nitrogen-containing vinyl monomers, with the proviso that no more than 60% by weight of the esters contain not more than 11 carbon atoms in the ester group."

The opposition sought revocation of the patent in suit in its entirety based on Article 100(a) EPC (lack of novelty or inventive step) and on Article 100(b) EPC.

The opposition division found that the main and first auxiliary requests pending before it did not comply with the requirements of Article 56 EPC. The prior use alleged by the opponent was not convincingly shown. The alleged insufficiency of disclosure (Article 100(b)

EPC) was not founded in the statement setting out the grounds of opposition. Late-filed document (7) (EP-A-0 644 252) was not found prima facie relevant and thus not considered by the opposition division.

III. The documents cited in the opposition/appeal proceedings included the following:

(A1a) Declaration of Mr. Stöhr
(A1b) Rohmax competitive data, entry number 89/367
(A1c) Laboratory journal 10568
(A2) Declaration of Mr. Hammer
(A3) Declaration of Mr. Deusch, mass spectrogramm
(A4) Declaration of Mr. Moreno
(B1) Experimental report submitted by the opponent with the statement of grounds of opposition
(B2) Experimental report submitted by the opponent with letter dated 18 September 2007
(B3) Additional data submitted by the opponent with letter dated 14 November 2007
(B4) Experimental report submitted by the patentee with letter dated 24 September 2007
(C1) Experimental report submitted by the appellant with the statement of grounds of appeal
(C2) Experimental report submitted by the respondent with letter dated 30 September 2008
(1) EP-A-0 750 031
(2) EP-A-0 439 254
(5) EP-A-0 635 560
(7) EP-A-0 644 252
(11a) Data sheet for Exxal 10
(11b) Mail from Mr. Meinhardt dated 14 August 2006
(12a) Submissions of the Patentee in the examining procedure dated 31 December 2003

(12b) Submissions of the Patentee in the examining procedure dated 16 January 2004
(13) Data sheet for Nafold 810D
(14) Data sheet for Enerpar 11
(15) Data sheet for Anglamol 99
(16) Data sheet for AP/E Core 100N
(17) Data sheet for Nexbase 3043
(18) Data sheet for Viscoplex 1-300
(19) Print out of an entry for isodecanol from an online chemical data base
(20) Römpp-Lexikon Chemie, 10th Edition, Vol. 3, 1997; keyword "isodecanol"
(21) Römpp-Lexikon Chemie, 7th Edition, Vol. 3, 1973; keyword "isodecanol"
(22) Römpp-Lexikon Chemie, 10th Edition, Vol. 4, 1998; keyword "oxosynthese"
(23) Römpp-Lexikon Chemie, 7th Edition, Vol. 4, 1974; keyword "oxosynthese"
(24) Chemical book "Isodecylalkohol", CAS 25339-17-7
(25) Data sheet of Kyowa Hakko Chemical Co., Ltd
(26) Letter from Exxon Chemical company of 9 March 1998

IV. The opposition division held in particular that:

Document (A1b) indicated two different compositions for PMA 134. Furthermore, there was no indication whether the amounts were given by weight% or by mol%. Document (A1c) indicated another composition. The data in document (A1b) were inconsistent with each other and with the information from document (A1c). It was not clear whether document (A3) related to PMA 134. Thus the composition of PMA 134 was not entirely clear. It was not clear what was made available under the product PAMA 134 mentioned in document (A4).

There were too many differences between examples 1 to 4 (document (B1)), examples 5 to 7 (document (B2)) and comparative examples CP1 to CP4 (document (B1)), allegedly according to the patent in suit, to evaluate an effect related to the structure of the monomer in the polymer. Furthermore, the copolymers were obtained under different conditions which led to different molecular weights as shown by document (B3). However, CP1 and CP2 showed that the compositions were solid at -40°C. The technical problem to be solved could not, therefore, be seen in the provision of polymers which reduced the extent of loss of viscosity at high temperatures while not adversely increasing the low-temperature viscosity of lubricating oil compositions. Indeed, the expression "not adversely increasing the low temperature viscosity" could only be understood in view of the requirement mentioned, namely the maximum Brookfield viscosity of 50000 at -40°C. Furthermore, the comparative examples provided by the Patentee (see document (B4)) were not a proper comparison vis-à-vis documents (2) or (5) since it was not clear that polymer C was similar to the polymer of example 3 of document (2) and polymer D was similar to example 10 of document (5). As alternative VI-improvers, the claimed invention was obvious in view of document (2) or (5).

V. The appellant's arguments, in so far they are relevant for the present decision, may be summarised as follows:

- The ground of opposition based on Article 100(b) EPC was not substantiated in the notice of opposition although the box corresponding to this ground in Form 2300 had been ticked. As a result, this ground of opposition had not been part of the opposition proceedings. Nor should it be introduced into the appeal proceedings.

- The documents provided by the respondent did not show a prior use. In particular, there was no indication whether the ratio of the different constituents of the composition were expressed in weight ratios or in mole ratios. The reported compositions were inconsistent.

- Regarding document (7), although this document disclosed that alkyl groups referred therein can be branched, it did not disclose 2-(C_{1-4})alkyl branching as required for the methacrylic acid esters of claim 1(b). To arrive at the copolymer of claim 1 a series of selections from document (7) had to be made. Documents (11a), (11b) and the statement in the summons to oral proceedings before the opposition division could not support the isodecyl rest having 2-(C_{1-4})alkyl branching. Due to the respective dates of documents (11a) and (11b), document (11b) related to a different specification of Exxal 10 from document (11a). Furthermore, there was no reason to assume that the isodecyl methacrylate of document (7) would inevitably have been prepared using the Exxal 10 product referred in document (11b). Document (19) showed that the branching for isodecanol was at the eighth carbon from the hydroxyl group. This was the type of branching the person skilled in the art commonly associated with an isodecyl alkyl group. As for the reference to the statement in the summons to oral proceedings, during oral proceedings before the opposition division the writer had withdrawn its statement. The writer was not a technical expert and had no evidence to support this statement.

- The data provided, in particular documents (C1) and (B4), showed that the viscosity of the claimed compositions was not adversely increased at low temperature. Such a result could not be deduced from the disclosure of the closest prior art document (2).

- The conclusion of the opposition division that the requirement of “not adversely increasing the low temperature viscosity” was not met over the whole scope of the claims, since comparative tests 1 and 2 of (B1), allegedly according to the patent in suit, were solid at -40°C and had therefore a maximum Brookfield viscosity at -40°C of greater than 50 000, was based on a misunderstanding of the patent. The referred to, i.e. [0014], related to *fully formulated automatic transmission fluids*. It stated that the copolymers claimed could have a major impact on the low temperature performance of automatic transmission fluids. It did not state that it was a requirement that incorporation of the claimed copolymers into **any** lubricating composition would result in that lubricating composition having a maximum Brookfield viscosity at -40°C of above 50 000 centipoise. This would be inconsistent with the rest of the description (see central table on page 15, gear lubricant compositions).

- The comparative test 1 disclosed in (B1) (according to example 7 of the patent and ESSO 100 N base oil) was not representative of fully formulated automatic transmission fluids. Example W of the patent in suit (copolymer of example 1, similar to example 7) showed that a fully formulated automatic transmission fluid had a Brookfield viscosity at -40°C of 12 200. In a fully gear formulated lubricant, copolymers of example 7 had appropriate viscosity at low temperature (see example G of the central table on page 15, Exxon 90 Neutral and document (B4), Table 1, letter dated 24 September 2007, ESSO 100 N base oil). The same conclusion applied to comparative test 2 (according to Example 15 of the patent in suit, ESSO 100 N base oil).

- The copolymers had been designed for lubricating oil compositions in general: they could be used in many lubricating oil compositions, for example gear lubricants, automatic transmission fluids, manual transmissions oils or hydraulic fluids. The specific high and low temperature requirements for a lubricating oil composition depended on the intended application of the composition.

- The comparative data submitted to the opposition division with letter dated 24 September 2007, namely document (B4), were a fair comparison between example 7 of the patent in suit, namely copolymer A, and example 3 of document (2), namely copolymer C, on the one hand (see tables 2 to 5), and between example 7 of the patent in suit, namely copolymer A, and example 10 of document (5), namely copolymer D (see tables 6 and 7), on the other hand. The comparative data provided with the statement of grounds of appeal, namely document (C1), tables 8 to 14, were a fair comparison between example 7 of the patent in suit, namely copolymer A or A1 (Risella oil), and example 3 of document (2), namely copolymer C or C1 (Risella oil). The comparative data provided with the statement of grounds of appeal, tables 15 to 18, were a fair comparison between example 7 of the patent in suit, namely copolymer A, and a copolymer E falling within the scope of claim 1 of document (5).

- In addition, tables 19 to 21 provided with the statement of grounds of appeal showed that in each of the various lubricating compositions tested, copolymer A was able to impart resistance to shearing to said compositions and to reduce the extent of loss of viscosity at high temperatures while not adversely increasing the low temperature viscosity of said compositions, better than the copolymer similar to copolymer A, differing in that it was prepared from an isodecyl methacrylate instead of a 2-ethylhexyl methacrylate monomer. Table 22 provided with the statement of grounds of appeal showed that all the blends used had similar stability.

- The polymers of document (2) did not comprise a unit as defined in claim 1 (b). The objective problem to be solved over document (2) was that of providing a polymer that could impart shear resistance to oil compositions as well as reduce the extent of loss of viscosity at high temperatures while not adversely increasing the low temperature viscosity of the composition. This particular balance of properties was not addressed in document (2). This document only dealt with the low temperature performance. It mentioned that shear stability could be varied.

- The data mentioned above showed that the copolymers claimed achieve this balance of properties better than copolymers of document (2). Tests 2 and 3 of document (B1) and test 6 of the letter dated 18 September 2010, document (B2), could not be fairly compared with comparative examples (CP1 to CP4), as had found the opposition division. In particular, tests 2 and 3 were made in the extremely light naphtenic oil, Risella 907. In CP2, Risella was not used. Furthermore, document (B3) showed that the molecular weight of the copolymers used in tests 2, 3, 6 and CP2 varied considerably. It followed that the shear stability was not kept constant.

- Document (5) disclosed poly(alkyl(meth)acrylates) useful as viscosity-improving additives for hydraulic fluids and was not concerned with viscosity-improving additives that could impart shear resistance to oil compositions as well as reduce the extent of loss of viscosity at high temperatures while not adversely increasing the low temperature viscosity of the composition. The polymers of document (5) did not comprise a unit as defined in claim 1 (b). The molecular weight of test 7 was not provided, whereas the molecular weight of CP4 was 75500. Risella 907 was an extremely light naphtenic oil. The data mentioned above showed that the copolymers claimed achieved this balance of properties better than copolymers of document (5).

VI. The arguments of the respondent (opponent) regarding the admissibility of the objection under Article 100(b) EPC, lack of novelty and lack of inventive step, in so far they are relevant for the present decision may be summarized as follows:

- The ground of opposition based on Article 100(b) should be admitted. The box had been crossed on the form and the ground was substantiated. It should also be examined under Article 114(1) EPC, because it was prima facie relevant.

- PMA 134 was a viscosity-improver sold by the company Repsol (Spain) from 1985 to 1989 (see document (A4)). PMA 134 was sold to Esso Chemical Belgium. A sample had been forwarded to Röhm GmbH for analysis, in a legal manner and without any secrecy agreement (see document (A1a). Its different constituents had been analysed (see RohMax Competitive Data, document (A1b)). This showed that PMA 134 comprised 49.3 wt.% C_{14}-C_{20} methacrylate, 45.6 wt.% 2-EHMA and 5 wt.% MMA. This composition corresponded to the claimed compositions. The drafting of the RohMax Competitive Data had taken place on 21 September 1989 (see (A1b)) and was linked to a page of a laboratory journal with the reference ATA 89/367 (see document (A1c). Document (A1c) confirmed the results set out in document (A1b). The pyrolysis of the copolymer followed by mass spectrometry was further evidence (see ion chromatogram, document (A3)). Document (A2) was also submitted as further evidence.

- Document (7) disclosed a copolymer consisting of: (a) 0 to 40.wt% (meth)acrylic ester units having 2 to 7 carbon atoms in the ester moiety; (b) 30 to 90.wt% (meth)acrylic ester units having 8 to 16 carbon atoms in the ester moiety; (c) 0 to 40.wt% (meth)acrylic ester units having 17 to 25 carbon atoms in the ester moiety; (d) 2 to 10.wt% hydroxyalkyl(meth)acrylic ester units having 2 to 7 carbon atoms in the ester moiety. The use of isodecyl as preferred rest for the ester moiety of unit (b) was explicitly mentioned. The use of methacrylic moieties were preferred.

- It transpired that document (7) disclosed a copolymer which contained: (a) 0 to 40.wt% methacrylic ester units having 2 to 7 carbon atoms in the ester moiety; (b) 30 to 90.wt% isodecylmethacrylate units; (c) 0 to 40.wt% methacrylic ester units having 17 to 25 carbon atoms in the ester moiety; (d) 2 to 10.wt% hydroxyalkylmethacrylic ester units having 2 to 7 carbon atoms in the ester moiety.

- Isodecylmethacrylate was a mixture of various decylmethacrylate isomers. It was well known that, due to the way of preparation, at least an isomer substituted in 2- was present and, therefore, an isomer with a 2-(C_1-C_4) alkyl substituent was mandatory. Documents (11a), (11b) and (20) to (26) were evidence that isodecanol was a mixture of isomers and showed that the mixture comprised an ester moiety containing a 2-(C_{1-4}-alkyl) substituent. This had also been acknowledged by the opposition division. Document (7) was novelty destroying.

- Regarding inventive step, viscosity improvers according to the patent in suit had to impart resistance to shearing and reduce the extent of loss of viscosity at high temperatures while not adversely increasing the low temperature viscosity.

- All the documents cited could basically be considered as the closest state of the art since they were all concerned with the same technical field, namely viscosity improvers for lubricants. A particular characteristic of a specific document, for instance one having a great similarity with the claimed solution, was therefore not to be considered. This was justified by the fact that the copolymer as such was claimed and other factors such as concentration of the polymer in the lubricating composition or the kind of base oil play no role. This corresponded to the wish of the user who was not interested in whether the copolymer determined had similarities with known viscosity improvers. What interested the user was to know the advantages or effects provided by the use of the claimed V.I (viscosity improvers) in comparison with those already known.

- All the documents (1) to (7) were the closest state of the art. Nevertheless, since for the documents (1), (2), (5) and (7) various studies had been submitted, those documents could be considered as the closest state of the art.

- The Proprietor had contested the probative value of the non-working examples provided with document (B1) (comparative examples 1 to 3). He had said that there was no requirement for a Brookfield viscosity of 50 000 cps or less at -40°C, that the comparative examples 1 and 2 of document (B1) were not fully formulated automatic transmission fluids, and that it was sufficient to show that in one case the copolymer worked to protect the copolymer as such for all the possible uses. That was wrong.

- First, it had to be noted that according to the patent in suit, the objective was to provide viscosity improving agents that both resisted shearing and reduced the extent of loss of viscosity at high temperatures while not adversely increasing the low temperature viscosity of lubricating oil compositions (see [0018]). It also had to be noted that the requirement of shear stability was not explained in the patent. It was common general knowledge confirmed by document (2) that the sonic shear stability of a V.I was controlled by the molecular weight, independently of its specific composition. Such a property could not form part of the technical problem to be solved.

- Secondly, as a mandatory requirement, the improved low temperature performance meant that the use of V.I in lubricating oil had to lead to a maximum Brookfield viscosity of 50 000 cps or less at -40°C. The teaching was valid for all basic oil and concentrations of copolymers. It was therefore not understood why the compositions of comparative examples 1 and 2 (document (B1), examples 7 and 15 of the patent in suit) would allegedly not be suitable for automatic transmissions fluids. A patent was only justified for a teaching which achieved a technical effect. Therefore, the compositions of comparative examples 1 to 3, in particular 1 and 2, could definitely not solve the technical problem, namely providing V.I having improved low temperature performance. It did not matter to what those compositions were compared. They were solid at -40°C.

- Likewise, the Appellant's criticisms regarding against the comparison between the copolymers (see document (B1)) due to the fact that the shear stability was not similar were not correct. The shear stabilities of the compared copolymers were clearly similar due to the similar kinematic viscosities at 100°. Moreover, it was of no importance with which prior art compositions the compositions of comparative examples 1 and 2 were compared. They were solid at -40°C and therefore could not have improved low temperature properties.

- The reproduction of the examples of document (2) (see document (B1), examples 2 and 3 and document (B2), Example 6) showed that the claimed copolymers in the same oil had worse low temperature properties (see comparative example 2 identical to example 15 of the patent in suit). The problem to be solved could only be seen in the provision of alternative viscosity-improvers for lubricants. The solution was obvious in view of the available state of the art.

- Likewise the examples containing the copolymers E and F (see document (C1)) were within the scope of the claims since it was well known that isodecylmethacrylate, due to the method of preparation, had to comprise a 2-(C_{1-4})alkyl branching. Therefore, those examples according to the patent in suit did not solve the technical problem.

- The tests provided with document (C2), i.e. Nos. 1 to 32, showed that the use of copolymers with a molecular weight of circa 50000 g/mol and with a similar polydispersity of circa 2.1 could be obtained. They displayed the same dynamic viscosity when formulated in the same basic oil at 100°C.

- If document (1) was considered as the closest state of the art, the patent in suit differed from that document in that in lieu of the linear C_9-C_{11}-methacrylate, a C_6-C_{11} methacrylate with a 2-C_{1-4} alkylsubstituent was used. Tests 1 and 5 of document (B1) and of letter of 18 September 2007 showed that the use of a C_6-C_{11} methacrylate with a 2-C_{1-4} alkylsubstituent provided no better low temperature performance as compared with the use of an isodecylmethacrylate or with a n-decyl methacrylate. In addition, document (2) showed that the shear stability was directly related to the molecular weight. Therefore, it was easy for the person skilled in the art to control the shear stability independently from the material composition (see document (B1), tests 2 and 3 and document (C2)).

- The subject-matter of the patent in suit differed from example 3 of document (2) in that a C_6-C_{11} methacrylate with a 2-C_{1-4} alkylsubstituent was used. The reworking of examples (see tests 2 and 3 of document (B1) and 6 of the letter dated 18 September 2010 and document (C2)) showed that they exhibited better low temperature performance than comparative test 2 of document (B1) which corresponded to example 15.

- Example 10 of document (5) disclosed a copolymer which in Nexbase 3043 showed a viscosity of 19 000 (see test 7 of letter of 18 September 2007, document (B2)). The best example of the patent (see comparative test 4 of document (B1)) showed no significantly better low temperature performance. See also document (C2). As a further V.I, the claimed subject-matter was obvious in view of the state of the art.

- The subject-matter of the patent in suit differed from document (7) only in that no more than 60% by weight of the esters contained not more than 11 carbon atoms in the ester group, since example 1 described a V.I comprising isodecylmethacrylate which consisted of a mixture containing 2-C_{1-4} alkylsubstituent. No improved technical effect could be acknowledged in view of comparative examples 14, 15, 16, 17, 18, 19 and 20 of document (C2). As a further V.I, the claimed subject-matter was obvious in view of the state of the art.

VII. During oral proceedings, the appellant withdrew auxiliary requests 1 to 7.

VIII. The appellant requested that the decision under appeal be set aside and the patent be maintained as granted.

IX. The respondent requested that the appeal be dismissed. The representative of the respondent raised the following objection in German during the oral proceedings: "*Ich bin in meinen Ausführungen zur erfinderischen Tätigkeit während meines Vortrags zeitlich, und zwar auf weitere 10 Minuten, beschränkt worden. Dies stellt einen Verfahrensmangel (Verstoß gegen den Grundsatz der Gewährung des rechtlichen Gehörs) dar, der eine Petition nach Artikel 112a EPÜ rechtfertigt.*" This objection was dismissed by the board.

X. At the end of the oral proceedings, the decision of the board was announced.

Reasons for the Decision

1. The appeal is admissible.

2. Admissibility of the ground of opposition based on Article 100(b) EPC

2.1 The first question to be answered is whether the ground of opposition under Article 100(b) EPC was filed with the statement of ground of opposition. If so, this ground of opposition *de facto* was part of the appeal proceedings.

2.2 The box corresponding to this ground was ticked in Form 2300. The statement of grounds of opposition contains four parts, namely I. Evidence, II. Subject-matter of the patent, III. Novelty and IV. Inventive step. There is no explicit reference to lack of sufficiency. An experimental report (document (B1)) was attached to this statement. In relation to this report, it was stated that the objective of this patent was to provide a copolymer having improved low temperature performance and that this objective was not solved as shown by comparative examples 1 to 3 (allegedly according to the patent in suit). That kind of argumentation is typically used against inventive step rather than insufficiency, given that this contested technical effect is not part of the claim but is part of the technical problem to be solved (see G 1/03, OJ EPO 2004, point 2.5.2). Therefore, the ground of opposition under Article 100(b) EPC was not filed with the statement of grounds of opposition or within the nine-month opposition period after grant of the patent.

2.3 Article 114(1) EPC requires the European Patent Office to examine the facts of its own motion. However, this possibility has been strictly limited in opposition proceedings:

"2. In principle, the Opposition Division shall examine only such grounds for opposition which have been properly submitted and substantiated in accordance with Article 99(1) in conjunction with Rule 55 EPC. Exceptionally, the Opposition Division may in application of Article 114(1) EPC consider other grounds for opposition which, prima facie, in whole or in part would seem to prejudice the maintenance of the European patent." (see G 10/91, OJ EPO 1993, 420, Headnote II).

2.4 The opposition division held that this ground of opposition was not sufficiently substantiated and refused to admit it into the opposition proceedings.

2.5 Since the refusal constitutes a discretionary decision on the part of the opposition division, the board may review it only in so far as to examine the department of first instance, when exercising its discretion, applied the wrong criteria, disregarded the correct criteria or acted arbitrarily. Accordingly, the board need not decide whether it would have exercised such discretion in the same way as the department of first instance.

2.6 In its decision, the opposition division justified its decision as follows:

"It is noted that the opponent himself was able to carry out the invention (see B1, comparative tests). The opposition division is of the opinion that the arguments provided by the opponent concerned inventive step rather than sufficiency of disclosure" (see point 1)."

2.7 The exercise of the discretionary power was, therefore, not arbitrary, and the criteria used were reasonable. There is no reason to call into question the way in which the opposition division exercised its discretionary power.

2.8 In conclusion, the ground of opposition under Article 100(b) EPC does not form part of the opposition proceedings. And, since the patentee did not give his consent, it is not admitted into the appeal proceedings either.

3. Novelty - alleged public prior use

3.1 Document (A1b), is RohMax competitive data giving information concerning the origin as well as the composition of the sample named PMA 134. One of the crucial items of information is the composition of the said sample, which is indicated on line 7 under "Composition". This line lists three types of constituents which are present in the sample PMA 134, namely C_{14}-C_{20}-methacrylate, F70 and F3.

- C_{14}-C_{20}-methacrylate present in PMA 134 corresponds to the methacrylic acid esters containing from 9 to 25 carbon atoms in the ester group according to the polymer of type (a) of claim 1 of the main request.

- The fact that F70 represents the specific compound 2-ethylhexylmethycrylate, that is to say, a methacrylic acid ester containing from 7 to 12 carbon atoms in the ester group, said ester group being substituted at the position 2 by a C1-C4 alkyl according to polymer of type (b) of claim 1 of the main request, was confirmed by document A2, and has not been disputed by the appellant.

- F3 corresponds to the methylmethacrylate (see document A2). Due to the presence of the word "comprising" in the wording of claim 1, methylmethacrylate can be present in the compositions claimed in claim 1 of the main request.

- These specific constituents of PMA 134 are present in specific proportions, namely 49.3 for the C_{14}-C_{20}-methacrylate, 45.6 for the 2-ethylhexylmethycrylate and 5.0 for the methylmethacrylate. It cannot be inferred neither from document (A1b) whether these ratios correspond to a weight ratio or a molar ratio, contrary to the respondent's contention.

3.2 However, as pointed out by the opposition division, document (A1b) also discloses a different composition for PMA 134, i.e 46 for the C_{14}-C_{20}-methacrylate, 48 for 2-ethylhexylmethacrylate and 5 for methylmethacrylate. Document (A1c) indicates a composition for PMA 134 comprising F3, F21, F70 and C_{14}-C_{20}-methacrylate. Thus the entries of the competitive database are inconsistent with each other and with the information from document (A1c). Document (A3) relates to the mass spectrogram of a sample no. 10568/81B-2. It is not clear whether it actually refers to PMA 134, which has a lab journal No. 10568/81. This document is, therefore, not relevant. Document (A4) relates to a product PAMA 134, the composition of which is unknown.

3.3 In view of the same evidence as that presented before the first instance, the board comes to the same conclusion as the opposition division, namely that due to the inconsistencies of the documents cited, no prior use can be acknowledged.

3.4 This applies also to claim 8, which is a process to make the copolymer of claim 1, as well as to the additive concentrate, the lubricating oil, the gear lubricant and the automatic transmission fluid of claims 22 to 25, since they are characterised either by the copolymer of claim 1 or the copolymer obtained by the process of claim 8.

4. Novelty - document (7)

4.1 Document (7) discloses a copolymer consisting of (a) 0 to 40.wt% (meth)acrylic ester units having 2 to 7 carbon atoms in the ester moiety; (b) 30 to 90.wt% (meth)acrylic ester units having 8 to 16 carbon atoms in the ester moiety; (c) 0 to 40.wt% (meth)acrylic ester units having 17 to 25 carbon atoms in the ester moiety; and (d) 2 to 10.wt% hydroxyalkyl(meth)acrylic ester units having 2 to 7 carbon atoms in the ester moiety.

The use of isodecyl as preferred rest for the ester moiety of unit (b) is explicitly mentioned. The use of methacrylic moieties is preferred.

4.2 Although it is relevant to examine whether a serie of selections from document (7) has to be made in order to arrive at the copolymer of claim 1, it is also decisive to examine whether the isodecyl rest designates unambiguously an alkyl rest having a isodecyl rest with 2-(C_{1-4})alkyl branching.

4.3 It is first noted that in organic chemistry the word "isoalkyl" denotes a linear alkyl chain comprising at the end of the chain a group $(CH_3)_2CH$-. This basic common general knowledge is eventually confirmed by document (19).

4.4 The question is whether the skilled reader in the field of lubricants would have nevertheless unambiguously understood when reading document (7), which has a priority filing date of 20 February 1993, that an isodecyl rest designates an alkyl rest having a 2-(C_{1-4})alkyl branching.

4.5 Due to the respective dates of documents (11a) and (11b), October 2008 to September 2009 and 14 August 2006 respectively, document (11b) may relate to a different specification of Exxal 10 than document (11a). In addition, those documents do not prove the knowledge of the person skilled in the art in 1993. Furthermore, there is no reason to assume that the isodecyl methacrylate of document (7) would inevitably have been prepared using the Exxal 10 product referred to in document (11b), even though it is assumed that the same Exxal 10 was available in 1993. Furthermore, although it can be acknowledged from documents (20) to (23) that isodecylalcohol is the trivial name for an isomer mixture obtained by oxosynthesis, it is not indicated in document (7) that the isodecyl rest comes from an isodecanol produced by oxosynthesis or that "isodecyl" is a "trivial" name. Unless otherwise stated, patents in chemistry are written using the official terminology. Therefore, the arguments of the respondent in that respect must fail. Documents (24) to (26) are also not relevant, because document (24) discloses the methyl-8-nonanol (see formula and synonyma), document (25) does not disclose the formulae of the different isomers and it does not show that the isodecydecanol of document (7) came from Kyowa, and document (26) relates to Exxal 10. There is no reason to assume that the isodecyl methacrylate of document (7) would inevitably have been prepared using the Exxal 10 product.

4.6 As for the reference to the statement in the summons to oral proceedings before the opposition division, this allegation is unsubstantiated.

4.7 The claimed subject-matter is novel over document (7).

4.8 Since no other objection based on Article 54 EPC was raised by the respondent, the board concludes that the subject-matter of the patent in suit is novel.

5. Inventive step

5.1 According to the established jurisprudence of the boards of appeal, it is necessary, in order to assess inventive step, to identify the closest prior art, **to determine in the light thereof the technical problem which the invention addresses and successfully solves**, and to examine the obviousness of the claimed solution to this problem in view of the state of the art. This problem-solution approach ensures the assessment of inventive step on an objective basis and avoids an ex post facto analysis.

5.2 One of the questions to be addressed in the present case is to define the technical problem to be solved.

5.2.1 The appellant has contended that the technical problem to be solved can be seen in the provision of viscosity improvers that both resist shearing and reduce the extent of loss of viscosity at high temperatures while not adversely increasing the low temperature viscosity of lubricating oil compositions. By contrast, the respondent has contended that the patentee could not deviate from the technical problem that he has himself defined and to which he is bound (as mandatory requirement, the improved low temperature performance means that the use of V.I in lubricating oil must lead to a maximum Brookfield viscosity of 50 000 cps or less at -40°C).

5.2.2 However, the problem-solution approach is rendered objective by the fact that the technical problem is defined not by the patentee himself (subjective approach) but vis-à-vis the closest state of the art (on condition of course that the technical problem to be solved, as defined by the objective approach, is derivable from the content of the application as filed). Therefore, defining a technical problem without relying on the closest state of the art is not a relevant approach.

5.3 The first step is thus to identify the closest prior art. According to the established jurisprudence of the boards of appeal, the closest prior art is a prior art document disclosing subject-matter aiming at the same objectives as the claimed invention and having the most relevant technical features in common, i.e. requiring the minimum of structural modifications (see Case Law of the Boards of Appeal of the EPO, 5th edition 2006, Section I.D.3.1, "Determination of closest prior art in general", page 121).

5.3.1 The patent-in-suit relates to viscosity improvers, including dispersant viscosity improvers for lubricating oils. More precisely, the patent in suit offers as its objective the provision of a viscosity improver which does not adversely affect the low-temperature viscosity of the lubricant containing, which reduces the extent of loss of viscosity at high temperatures and which resists shearing (see paragraphs [0011], [0016] to [0018]). Documents (1), (2), (5) and (7) have been cited. Documents (1), (2) and (5) have the same general objective. By contrast, document (7) relates to a method for making a compatibiliser for a concentrated viscosity index improving blend of poly(meth)acrylate copolymer and a polyolefin copolymer and does not have the same objective. Document (1) does not address shear stability and is, therefore, less relevant than documents (2) or (5).

5.3.2 It is acknowledged that documents (2) and (5) have the same objective as the patent in suit (see document (2), page 2, lines 8 to 16 and page 3, lines 56-57;

document (5), page 2, lines 5 to 7 and page 8, lines 10 to 13 respectively). However, the examples of document (5) relate to copolymers of linear methacrylate monomers, whereas example 3 of document (2) relates to a copolymer made from a monomer mix comprising DPMA, a mixture of 78 wt.% linear and 22 wt.% branched isomers of 23 wt.% dodecyl, 28 wt.% tridecyl, 28 wt.% tetradecyl and 21 wt.% pentadecyl methacrylate. Therefore, document (2) is structurally closer to the patent in suit than document (5). For these reasons, document (2) is the closest state of the art for defining the technical problem to be solved.

5.3.3 Document (B4) submitted by the patentee during the opposition proceedings contained, in particular, a test made with copolymer C, which is a copolymer prepared from a monomer mix of 88.3 wt.% of C_{12}-C_{15} methacrylate (about 20 wt.% each C_{12} and C_{15}, 30 wt.% each C_{13} and C_{14}, and less a total of about 5 wt.% C_{11} or less and C_{16} or greater), 7.67 wt.% methyl methacrylate and 4 wt.% dimethylaminopropyl methacrylamide. It was contended that this was a similar monomer mix to that used in example 3 of document (2).

5.3.4 The opposition division had correctly held that this example was not a proper comparison because the patentee could not confirm that the monomer mix contained 22 wt.% of branched isomer (see document (2), example 3, line 57, in connection with page 3, lines 23 to 25). It had therefore correctly concluded that an improvement could not be acknowledged.

5.3.5 However, with the statement of grounds of appeal the appellant confirmed that the C_{12}-C_{15} methacrylate used to prepare polymer C contained about 22% branched isomers and corresponded to the DPMA monomer mix of document (2), example 3. It must be concluded that copolymer C is similar to the copolymer disclosed in example 3 of document (2).

5.3.6 Different samples with either copolymer C (example 3 of document (2)) or copolymer A (copolymer of example 7 of the patent in suit) were prepared with a similar shear stability (see documents (B4) and (C1).

With Nexbase 3043(265.7239) as base fluid, the Brookfield viscosity at -40°C of copolymer A is 380 000, whereas it is > 1M with copolymer C (see Table 2). It is clear that copolymer A has an improved low temperature performance. The kinematic viscosities of both compositions at 40°C and 100°C are similar (61.78, 64.33 and 12.41, 12.89 respectively), so that it may be concluded that the viscosity at high temperature is appropriate (no dramatic loss of viscosity). No shear stability is mentioned. It is however noted that the appellant contended that the shear stability of the samples was similar and that the respondent submitted nothing in that respect.

With a gear oil composition as base fluid, the Brookfield viscosity at -40°C of copolymer A is 64 000, whereas it is > 1M with copolymer C (see Table 4). It is clear that copolymer A has an improved low temperature performance. The kinematic viscosities of both compositions at 40°C and 100°C are similar (100.5, 109.9 and 18.64, 19.4 respectively), so that it may be concluded that the viscosity at high temperature is appropriate (no dramatic loss of viscosity). The viscosity loss after D 5261 is -7.5 (copolymer A) and -4.4 (copolymer C) (see Table 22). These low figures for viscosity loss show that each blend has good and similar shear stability.

With an automatic transmission fluid as base fluid, the Brookfield viscosity at -40°C of copolymer A is 8 670, whereas it is 148 000 with copolymer C (see Table 14). It is clear that copolymer A has an improved low temperature performance. At 40°C and 100°C the kinematic viscosities of both automatic transmission fluids are similar, so that it may be concluded that the viscosity at high temperature is appropriate (no dramatic loss of viscosity). The viscosity loss after D 5261 is -3.3 (copolymer A) and -4.5 (copolymer C) (see Table 22). These low figures for viscosity loss show that each blend has good and similar shear stability.

5.3.7 Copolymers A1 and C1 were also prepared, using a different oil, Risella oil (40N naphtenic oil).

With Nexbase 3043(265.7239) as base fluid, the Brookfield viscosity at -40°C of copolymer A1 is 63 000, whereas it is > 1M with copolymer C (see Table 10). It is clear that copolymer A1 has an improved low temperature performance. At 40°C and 100°C the kinematic viscosities of both blends are similar, so that it may be concluded that the viscosity at high temperature is appropriate (no dramatic loss of viscosity). The shear stability is not indicated. It is however noted that the appellant contended that the shear stability of the samples was similar and that the respondent submitted nothing in that respect.

With a gear oil composition as base fluid, the Brookfield viscosity at -40°C of copolymer A1 is 39 000, whereas it is > 1M with copolymer C (see Table 12). It is clear that copolymer A1 has an improved low temperature performance. At 40°C and 100°C the kinematic viscosities of both automatic transmission fluids are similar, so that it may be concluded that the viscosity at high temperature is appropriate (no dramatic loss of viscosity). The shear stability is not indicated. It is however noted that the appellant contended that the shear stability of the samples was similar and that the Respondent submitted nothing in that respect.

5.3.8 Those results are confirmed with samples containing a pour point depressant (see tables 3, 5, 8, 9, 11 and 13), which is a particularly useful type of additive often included in lubricating oils (see patent in suit, page 12, lines 46 to 50).

5.3.9 Those results show that a copolymer according to example 7 of the patent in suit can be used in oil compositions as a viscosity improving agent which resists shearing and reduces the extent of loss of viscosity at high temperatures while not adversely increasing the low temperature viscosity, and that its performance is better than the closest state of the art, namely example 3 of document (2).

5.4 Hence the technical problem to be solved might be seen in the provision of viscosity improvers exhibiting better performance than the closest state of the art, regarding the simultaneous properties of reducing the loss of viscosity at high temperature while not adversely increasing the low temperature viscosity and while also resisting shearing. Nevertheless, it is necessary to check whether this problem is plausibly solved over the whole claimed area and not simply for the specific example 7.

5.4.1 Relying on the statement of the patent in suit that for automatic transmission fluids the requirements for maximum Brookfield viscosities are 50 000, 20 000 and 10 000 centipoise, or even lower at -40°C, the respondent argued on the basis of comparative examples 1, 2 or 3 (see B1) that the technical problem was not solved by examples 7 and 15 of the patent in suit, because the compositions were solid at -40°C or exhibited a viscosity, which was too high (400 000). However, those tests were made with an ESSO 100N mineral oil, not with an Exxon 90 neutral mineral oil as in example 7 of the patent in suit (see page 14, line 56). Those tests are therefore not relevant. Moreover, the appellant has provided counter-experiments to show that the copolymer of example 7 behaves well at -40°C in a fully formulated gear lubricant (see example G of the patent in suit, Exxon 90 neutral mineral oil) and has sufficient viscosity at -25°C in an 18.18% solution in ESSO 100 N (see table 1 of B4).

5.4.2 In view of the technical problem defined above, the tests provided by the respondent do not show that example 7 cannot fulfil the technical advantages in view of the closest state of the art and that the technical problem was not solved over the whole area. It is also pointed out that this problem is quite in line with the disclosure of the patent in suit (see page 3, lines 14 to 16: "particularly desirable are viscosities improving agents that both resist shearing and reduce the extent of loss of viscosity at high temperatures while not adversely increasing the low temperature viscosity of lubricating oil compositions"). The board considers that the requirement that the Brookfield viscosity be lower than 50 000 at -40°C may be disregarded because the technical problem may be defined in a more general manner which does not require such a condition (see above).

5.4.3 The respondent has also provided further tests (see document (C2)):

In those tests the properties which can be obtained by the use of copolymers with an M_w of 50 000 g/mol or so and a similar polydispersity of about 2.1 were studied. All the formulations in the same oil have the same kinematic viscosity at 100°C and are comparable with each other.

5.4.4 That some formulations (see tests 1-3; 4; 9-12; 17-18, 20; 25-28) which fall within the scope of the claims are solid at -40°C or have viscosity above 50 000 (see points 1 and 2 of letter of the respondent dated 30 September 2008) is not evidence that those formulations are not better than the formulation of Example 3 of document (2) and, therefore, do not solve the technical problem defined above. The board considers that the requirement that the Brookfield viscosity be lower than 50 000 at -40°C because the technical problem may be defined in a more general manner which does not require such a condition (see above).

5.4.5 The fact that some formulations which do not fall under the scope of the claims because they have no branched monomers (formulations involving HODMA which is a C_8-C_{10} methacrylate mixture from Nafol 810D) are as good as the claimed formulations is not relevant. The respondent has not shown that those formulations reflected the closest state of the art, namely example 3 of document (2) involving DPMA which is a C_{12}-C_{15} mixture (see point 5.3.5 above) and not HODMA (see letter dated 30 September 2008 of the respondent, page 22, point 3). Tests 6, 13-14, 21-22, 29-30 are not a proper comparison with the claimed invention.

5.4.6 That the copolymer according to example 2 of document (1) allegedly may be as good if not better as the claimed copolymers (see letter dated 30 September 2008 of the respondent, page 22, point 4) is not relevant since document (1) is not the closest state of the art. The same conclusion applies for the tests to compare copolymers comprising HODMA (tests 7, 15, 23 and 31) with copolymers comprising isodecylmethacrylate (tests 8, 16, 24 and 32), since the tests are not in accordance with the closest state of the art (see letter dated 30 September 2008 of the respondent, page 22, point 5) and isodecylmethacrylate is clearly different from component (b) of claim 1. That the use of a pour point depressant has no influence (see letter dated 30 September 2008 of the respondent, page 22, point 6) is not relevant for the present decision, since a pour point depressant may or may not be present according to the patent in suit (see page 12, lines 46 to 50) and is not a feature of claim 1.

5.4.7 Therefore, the tests provided by the respondent with document (C2) do not show that example 7 cannot fulfil the technical advantages in view of the closest state of the art and that the technical problem was not solved over the whole area.

5.4.8 In addition, it is observed that the appellant has provided a comparative test, i.e. copolymer F, wherein in the copolymer of example 7 of the patent in suit, the 2-ethylhexyl methacrylate, is replaced by an isodecyl methacrylate, a monomer envisaged in document (2) (see page 3, line 21). The results given in Tables 19-21 of document (C1), relating respectively to base fluid Nexbase 3043 (265.7239) + PPD, gear oil composition + PPD and automatic transmission fluid, show that the Brookfield viscosity at -40°C is lower with the composition of example 7 than with the composition with copolymer F, namely 19 800 versus 22 000; 46 000 versus 49 000 and 8 670 versus 8 770.

5.4.9 Regarding documents (12a) and (12b), the respondent argued that the criticisms of the appellant regarding the tests disclosed in document (B1) were not well-founded because the comparison of copolymers of different shear stability had been used by the applicant himself. However, this question is of no relevance for the present decision since the board has found that document (B1) was not relevant for other reasons (see point 5.4.1 above).

5.4.10 In conclusion, the respondent has provided no evidence that the comparison between example 7 of the patent in suit and example 3 of document (2) was not valid. Bearing in mind that the technical problem to be solved in view of the proper comparison between example 3 of document (2) and example 7 of the patent in suit may be seen in the provision of viscosity improvers exhibiting better performance than the closest state of the art by having the simultaneous properties of reducing the loss of viscosity at high temperature while not adversely increasing the low temperature viscosity and resisting shearing, the respondent has not provided any evidence that all the formulations covered by claim 1 do not exhibit such improved performance. The board considers that the technical problem defined above is plausibly solved over the whole claimed area.

5.5 It remains to be decided whether the claimed subject-matter is obvious as a solution to the technical problem defined above in view of the prior art cited.

5.5.1 None of the prior art documents cited discloses as viscosity improver copolymers obtained from a mix comprising methacrylic acid esters containing from 7 to 12 carbon atoms in the ester group, said ester having a 2-(C_{1-4}alkyl)-substituent. In particular, the isodecyl methacrylate cited in document (2) or (5) have a different structure. The person skilled in the art finds, therefore, no hint in the prior art which would have enabled him to expect that the claimed polymers could solve the technical problem defined above.

5.5.2 For this reason, the subject-matter of claim 1 involves an inventive step within the meaning of Article 56 EPC.

This conclusion also applies to dependent claims 2 to 5. Claims 6 to 21 relate to a process for preparing such copolymers and derive their patentability from the same inventive concept. Claims 22 to 26 relate to the use of copolymers in lubricating oil and derive their patentability from the same inventive concept.

5.6 The patent is therefore to be maintained unamended.

6. Alleged violation of the right to be heard - Article 112a EPC

6.1 After the board had announced its conclusion that the subject-matter of the patent involved an inventive step and before its chairman had closed the debate, the respondent raised an objection under Article 112a EPC. The terms of the objection were discussed with the board. The respondent and the board agreed on the draft set out in the minutes.

6.2 The facts are the following. The chairman at 12.00 hrs gave the floor to the appellant for submitting its arguments in favour of inventive step of the subject-matter of the main request (patent as granted). The appellant was informed by the board that if the problem to be solved was considered as being the provision of an improved composition over the closest prior art, the burden of proof was on him.

The appellant based its argumentation on the comparative data provided during opposition proceedings and submitted with the statement setting out the grounds of appeal, in particular example 3 of document

(2) vis-à-vis copolymer A made according to example 7 of the patent in suit.

The chairman being about to give the floor to the respondent at 12.30 hrs, the latter informed the board that its presentation would be long and requested an interruption. After a short deliberation the oral proceedings were adjourned until 13.00 hrs.
Around 13.02 hrs oral proceedings were resumed and at 13.05 hrs the floor was given to the respondent, being reminded that in this case, the respondent had to contest the submissions of the appellant regarding the alleged improvement.

The respondent presented his case until interrupted by the chairman at 14.35 hrs (1 hour and 30 minutes later). He was informed that he should finish within ten minutes, as floor had to be given to the appellant afterwards and seven auxiliary requests were possibly to be discussed after the main request. The respondent said this interruption was contrary to its right to be heard and requested that this incident be recorded in the minutes (see above point IX).

Five minutes later (14.40 hrs), the respondent declared that he had finished. Until 15.30 hrs, the parties exchanged their arguments. Then the chairman asked the parties whether they had further comments and both the appellant and the respondent expressly stated that they did not have further comments. The chairman adjourned then the oral proceedings until 16.00 hrs. The board's deliberation actually lasted until 16.30 hrs. Then the oral proceedings were resumed and the chairman announced that the subject-matter of the main request involved an inventive step.

An objection under Article 112a EPC was raised by the respondent.

6.3 After deliberation, the board took the view that no procedural violation has taken place, because although the respondent had been interrupted by the chairman and given ten more minutes to finish his presentation, the exchange of arguments between the parties lasted until 15.30 hrs. The chairman was then entitled to adjourn the proceedings for deliberation after the parties had declared explicitly that they had no further comments. Therefore, the respondent's right to be heard had been fully respected. The objection under Article 112a EPC was, therefore, not founded.

Furthermore, whilst the right to be heard is fundamental, it also has a limit, namely the other party's equal right to be heard. One particular function of the chairman in oral proceedings is to ensure that the parties are treated fairly. In this case it was his duty to ensure that after one hour and forty minutes (until 14.45 hrs, namely ten minutes after the interruption), the appellant was given sufficient time to respond, so that its own right to be heard could also be respected. The board considers therefore that the interruption by the chairman was justified under Article 15(4) RPBA.

The objection of the respondent based on Article 112a EPC is therefore rejected.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is maintained unamended.

The Registrar The Chairman

M. Kiehl P. Ranguis